REMARKS

Please reconsider the application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully reviewing this application, and allowing claims 2-8.

Disposition of Claims

Claims 1-11 are pending in this application. Claims 1 and 9 were independent. Claims 2-8, directly or indirectly dependent on claim 1, were deemed to contain allowable subject matter. Claims 2 and 5, directly dependent on claim 1, were rewritten in independent form incorporating the base limitations of claim 1. Thus, claims 1, 2, 5, and 9 are currently independent. Claim 10 depends on claim 9, and claim 11 depends on claim 1.

Claim Amendments

Independent claim 1 has been amended to recite that "a timing of both the transmit electronics and the receive electronics is controlled by a timing control circuit." Support for this amendment may be found, for example, in paragraph [0052] and Fig. 1 of published application.

As discussed above, claims 2 and 5 were amended into independent form by incorporating the base limitations of claim 1. Support for these amendments may be found, for example, in original claim 1.

No new matter has been added by way of these amendments.

Rejection(s) under 35 U.S.C § 102

Claims 1 and 9-11 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 4,942,360 ("Candy"). To the extent that this rejection may still apply to the amended claims, this rejection is respectfully traversed.

Referring to the detailed description for purposes of illustration only, embodiments of the invention are directed to a metal detector and a method of metal detection where accuracy of generation of a constant reactive voltage is aided whilst simultaneously maintaining constant reactive transmit voltages (*see*, *e.g.*, paragraphs [0001]-[0002] of published application). In one or more embodiments, the targeted application is in metal detectors operable in environments of varying magnetic permeability that may alter the inductance of transmit coils during investigation of said environments (*see* paragraph [0003]).

An exemplary electronic detector of the present invention, as shown in Fig. 1, includes a transmit coil 1, transmit electronics adapted to generate a transmit voltage signal applied to the transmit coil, and associated receive electronics adapted to receive a signal associated with the magnetic field and process said received signal to generate an indicator output. The transmit electronics includes switching voltage electronics 5, which consists of solid-state switches 7, 8, and 9, whose ON and OFF times are controlled by a timing control circuit 14. Switch timing associated with Digital Signal Processing (DSP) or synchronous switched demodulation at the demodulators of the receive electronics is also controlled by timing control circuit 14 (*see* paragraph [0052]). In other words, control signals for controlling ON and OFF times of switches in the demodulator

circuits of the receive electronics are generated by the timing control circuit 14. Such an arrangement simplifies synchronization of switching with the input signal.

Accordingly, amended independent claim 1 recites, *inter alia*, "wherein a timing of both the transmit electronics and the receive electronics is controlled by a timing control circuit."

Candy is directed to a conducting metal discriminating detection apparatus whose transmit electronics includes at least a phase locked loop (PLL) 88 adapted to be locked to a frequency W1, and optionally phase locked loops 108 and 109 adapted to be locked to frequencies W2 and W3. A PLL includes at least one two quadrant synchronous demodulator solid-state switch 77, which has a reference phase 78 locked to the phase of current of the transmitting coil at frequency W1.

Based on the transferred phase response of the amplifier 121 in the receive section being substantially zero, reactive and resistive phase references are selected for individual frequencies (W1, W2, W3). The receive electronics includes synchronous demodulators (PLLs) similar to that of the transmit electronics (*see* Fig. V and col. 9, line 11 through col. 10, line 53 of Candy). This would also imply that one particular PLL of the receive electronics would also have at least one solid-state switch that has a reference phase. Candy, however, does not disclose anywhere a timing control circuit that controls the ON and OFF times of said solid-state switches. Even if timing control were to be assumed in the transmit electronics and receive electronics, Candy does not show or suggest a timing control circuit that controls a timing of both the transmit electronics and the receive electronics, as required by amended independent claim 1.

Thus, Candy does not show or suggest at least "wherein a timing of both the transmit electronics and the receive electronics is controlled by a timing control circuit," as required by

amended independent claim 1. Independent claim 1, therefore, is not anticipated by Candy. Dependent claim 11 is also not anticipated for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

With regard to claim 9, Candy does not disclose any compensatory circuit or technique for overcoming the variation of reactive transmit voltages at different frequencies with variations in inductance, i.e., a contributor to the inductive component impedance. While it is true that elements 72, 82, and 83 are adapted to produce constant reactive transmit voltages at distinct frequencies (*see* Fig. V of Candy), the ratio of these reactive transmit voltages would not be constant under varying inductive component impedances. For this purpose, a search signal is varied in the practice of the present invention by differing amounts at different frequencies to compensate for varying inductive component impedances of the transmit coil. This is accomplished by processing the reactive transmit voltages such that the voltages are constant relative to each other but not necessarily constant in magnitude. By way of this technique, suitability of the present invention in environments of varying magnetic permeability is enhanced (*see* paragraphs [0014]-[0015], [0018]-[0019] and [0059]-[0061] of published application).

Thus, Candy does not show or suggest "generation of a search signal wherein a ratio of reactive transmit voltages at each of at least two frequencies is substantially constant for a selected range of transmit coil effective inductive component impedance," as alleged by the Examiner and required by independent claim 9. Independent claim 9 is, therefore, not anticipated by Candy. Dependent claim 10 is also not anticipated for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

Allowable Subject Matter

Claims 2-8 were deemed to contain allowable subject matter. As discussed above, claims 2 and 5 were rewritten in independent form by incorporating the base limitations of original claim 1. Accordingly, favorable entry of claims 2 and 5 is respectfully requested. By virtue of claims 3-4, and 6-8 being directly or indirectly dependent on claim 2, claims 3-4 and 6-8 are also patentable. Accordingly, favorable entry of claims 3-4 and 6-8 is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 04465/022001).

Dated: August 14, 2008

Respectfully submitted,

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